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EXAMINER

WILLIAMS, LAWRENCE B

ART UNIT

PAPER NUMBER

2634

DATE MAILED: 01/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/884,659

Applicant(s)

HINMAN ET AL.

Examiner

Lawrence B Williams

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 18 October 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-14 and 16-31 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 16-21, 26, 29 and 30 is/are allowed.
- 6) ☒ Claim(s) 1, 3, 5-7, 9, 14, 22-25, 27-28, 31 is/are rejected.
- 7) ☒ Claim(s) 2, 4, 8 and 10-13 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 June 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>1</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

2. Claim 25 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Amended claim 25 recites the limitation “differentially amplifying the amplified upstream DSL signal and the inverted amplified upstream DSL signal”. Applicant claim reads as if there are two independent signals. Neither the remainder of the claim nor the specification support this assertion.

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 9, 14, 31 are rejected under 35 U.S.C. 102(b) as being anticipated by Shenoi et al. (US Patent 6,507,606 B2).

(1) With regard to claim 9, Shenoi et al. discloses in Fig. 5, a device for amplifying DSL signals on a local loop, the DSL signals having a downstream frequency band (~180 kHz and up) and an upstream frequency band (~20 kHz up to ~80 kHz), the device comprising: a downstream filter/amplifying equalizer (HPF, AMP, HPF) coupled to the local loop for amplifying

downstream frequency band DSL signals and for attenuating upstream frequency band DSL signals; and an upstream filter/amplifying equalizer (LPF, AMP, LPF) coupled to the local loop for amplifying upstream frequency band DSL signals and for attenuating downstream frequency band DSL signals; and a set of POTS loading coils (510) adapted to be coupled to the local loop for improving transmission of POTS band signals over the local loop.

(2) With regard to claim 14, claim 14 inherits all limitations of claim 9 above.

Furthermore, Shenoi et al. also discloses in Fig. 5, wherein the downstream filter/amplifying equalizer is configured to amplify higher frequency components of the downstream frequency band DSL signals more than lower frequency components of the downstream frequency band DSL signals (HPF filters signal less than ~180 kHz and up before amplification), and the upstream filter / amplifying equalizer is configured to amplify higher frequency components of the upstream frequency band DSL signals more than lower frequency components of the upstream frequency band DSL signals (LPF filters signal less than ~20kHz before amplification).

(3) With regard to claim 31, Shenoi et al. discloses in Fig. 5, a method, comprising: amplifying on a local loop, DSL signals having a downstream frequency band and an upstream frequency band by, amplifying downstream frequency band DSL signals using a downstream filter/amplifying equalizer (HPF, AMP, HPF) and amplifying upstream frequency band DSL signals using an upstream filter/amplifying equalizer (LPF, AMP, LPF), attenuating upstream frequency band DSL signals using the downstream filter/amplifying equalizer and attenuating upstream frequency band DSL signals using the upstream filter/amplifying equalizer, and improving transmission of POTS band signals over the local loop using a set of POTS loading coils (510) adapted to be coupled to the local loop (abstract).

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-3, 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shenoi et al. (US Patent 6,507,606 B2) in view of Gambuzza (US Patent 6,226,322 B1).

(1) With regard to claim 1, Shenoi et al. discloses in Fig. 5, a loop extender (500) adapted to be coupled to a local loop for improving downstream and upstream DSL signals over the local loop, the downstream DSL signals traversing the local loop in a downstream direction (~20 kHz to ~80kHz) and having a downstream frequency band and the upstream DSL signals traversing the local loop in an upstream direction and having an upstream frequency band (~180 kHz and up), the loop extender (col. 1, lines 15-22) comprising: a first hybrid (2W-4W) coupled to the local loop for receiving downstream DSL signals transmitted over the local loop, a downstream filter/ amplifying equalizer (HPF-AMP-HPF) coupled to the local loop for amplifying downstream frequency band DSL signals and for attenuating upstream frequency band DSL signals received by the first hybrid, and attenuating other components outside the downstream frequency band that may have leaked through the first hybrid (The combination (2W-4W, HPF-AMP-HPF, 2W-4W) corresponds to applicant's down stream filter/amplifying equalizer as the HPF attenuates other components outside the downstream frequency band while the amplifier amplifies the downstream frequency band components that pass through the first HPF). Shenoi et al. does not explicitly teach a differential amplifier pair coupled to the downstream

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filter/amplifying equalizer for further amplifying the downstream DSL frequency band components; a second hybrid coupling the differentially amplifier pair too the local loop, the second hybrid differentially amplifying the downstream frequency bad components of downstream DSL signals and passing the differentially amplified downstream DSL signals to the local loop. Shenoi et al. does teach the downstream signals passing through a second 2W-4W hybrid circuit (the structure of which Shenoi et al. is silent) through which the DSL signals pass through to the local loop.

However, Gambuzza teaches in Fig. 2, a structure for Shenoi et al.'s (2W-4W) comprising a differential amplifier pair (220, 230) and a coupling transformer (214) which corresponds to applicant's second hybrid for use in a DSL system.

Thus since Shenoi et al. did not teach the structure of the 2W-4W one of ordinary skill in the art would inherently be motivated to find a teaching of their structure as disclosed by Gambuzza as proven line interface device for DSL systems.

(2) With regard to claim 2, Shenoi et al. also discloses in Fig. 5, wherein the downstream filter/amplifying equalizer is configured to amplify higher frequency components of the downstream frequency band of downstream DSL signals more than lower frequency components of the downstream frequency band of downstream DSL signals (only signals ~180 kHz and up are passed for amplification).

(3) With regard to claim 3, claim 3 inherits all limitations of claim 1 above. Furthermore, Shenoi et al. also discloses in Fig. 5, wherein the downstream filter/ amplifying equalizer is configured to amplify higher frequency components of the downstream frequency band of

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downstream DSL signals more than lower frequency components of the downstream frequency band of downstream DSL signals (~180 kHz and up).

(3) With regard to claim 5, Sheno et al. also discloses the loop extender comprising POTS loading coils adapted to be coupled to the local loop for improving transmission of POTS band signals over the local loop (col. 9, lines 45-54).

(4) With regard to claim 6, Gambuzza discloses wherein the downstream and upstream DSL signals include VDSL signal (col. 4, lines 34-44).

(5) With regard to claim 7, Sheno et al. also discloses wherein the downstream and upstream signals include Category I ADSL signals (col. 18, lines 44-56).

7. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sheno et al. (US Patent 6,507,606 B2) in view of Gambuzza (US Patent 6,226,322 B1).

(1) With regard to claim 22, Sheno et al. discloses in Fig. 5, a method for improving DSL service over a local loop (col. 1, lines 15-22), comprising: coupling a first loop extender to the local loop between a central office and a customer premises; and improving transmission of POTS band signals over the local loop using a set of POTS loading coils (501) within the first loop extender that are adapted to be coupled to the local loop; and employing the first loop extender to amplify upstream DSL signal passing over the local loop using a second hybrid, to at least partially compensate for DSL signal attenuation caused by the DSL signals passing over the local loop.

Sheno et al. does not explicitly disclose differentially amplifying the signals though he discloses 2W-4Ws of which he is silent as to the structure thereof. However, Gambuzza teaches

in Fig. 2, a structure for Shenoi et al.'s (2W-4W) comprising a differential amplifier pair (220, 230) and a coupling transformer (214) which corresponds to applicant's second hybrid to at least partially compensate for DSL signal attenuation caused by the DSL signals passing over the local loop.

Thus since Shenoi et al. did not teach the structure of the 2W-4W one of ordinary skill in the art would inherently be motivated to find a teaching of their structure as disclosed by Gambuzza for a proven line interface device for DSL systems.

8. Claims 23, 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shenoi et al. (US Patent 6,507,606 B2) in combination with Gambuzza (US Patent 6,226,322 B1) as applied to claim 22 above, and further in view of Bardutz et al. (US Patent 4,766,606).

(1) With regard to claim 23, as noted above, Shenoi et al. in combination with Gambuzza disclose all limitations of claim 22 above. They do not however disclose coupling a second loop extender to the local loop between the central office and a customer premises, the first and second loop extenders being disposed in series with each other and separated by a distance; and employing the second loop extender to differentially amplify upstream and downstream DSL signals passing over the local loop to at least partially compensate for DSL signal attenuation caused by the DSL signals passing over the local loop.

However, Bardutz et al teaches multiple loop extenders in Fig. 1 disposed between a central office and a subscriber. It would have been obvious to use a second or more of these extenders to simply extending the range of the DSL signals.



(2) With regard to claim 24, though neither of the above references make a particular reference to the distance between a first and second extender, it would simply be a matter of design choice to coincide with the ability of the designed extender.

9. Claims 27, 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shenoi et al. (US Patent 6,507,606 B2) in combination with Gambuzza (US Patent 6,226,322 B1) and further in view of Bardutz et al. (US Patent 4,766,606).

(1) With regard to claim 27, Shenoi et al. discloses in Fig. 5, a method for improving DSL service over a local loop, comprising: receiving a downstream DSL signal from a central office; filtering the downstream DSL signal to attenuate signals outside a downstream frequency band (HPF-AMP-HPF; ~180 kHz and up) and amplifying the filtered downstream DSL signals to at least partially compensate for downstream DSL signal attenuation caused by the downstream DSL signals passing over the local loop.

Shenoi et al. does not explicitly teach differentially amplifying the amplified downstream DSL signal to further compensate for downstream DSL signal attenuation caused by the downstream DSL signals passing over the local loop. Shenoi et al. does teach the downstream signals passing through a second 2W-4W hybrid circuit (the structure of which Shenoi et al. is silent) through which the DSL signals pass through to the local loop.

However, Gambuzza teaches in Fig. 2, a structure for Shenoi et al.'s (2W-4W) comprising a differential amplifier pair (220, 230) and a coupling transformer (214) for the purpose of differentially amplifying the amplified downstream DSL signal to further compensate for downstream DSL signal attenuation caused by the downstream DSL signals passing over the

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local loop. Thus since Sheno et al. did not teach the structure of the 2W-4W one of ordinary skill in the art would inherently be motivated to find a teaching of their structure as disclosed by Gambuzza as proven line interface device for DSL systems.

Neither Sheno et al. nor Gambuzza teach further differentially amplifying the differentially amplified downstream DSL signal to further compensate for downstream DSL signal attenuation caused by the downstream DSL signal passing over the local loop; and passing the further differentially amplified downstream DSL signal onto the local loop for transmission to a customer premises wherein a hybrid differentially amplifies the differentially amplified downstream DSL signal and passes the further differentially amplified downstream DSL signal to the local loop.

However, Bardutz et al teaches multiple loop extenders in Fig. 1 disposed between a central office and a subscriber. A second loop extender of the same composition as already disclosed would account for further differentially amplifying the differentially amplified downstream DSL signal to further compensate for downstream DSL signal attenuation caused by the downstream DSL signal passing over the local loop; and passing the further differentially amplified downstream DSL signal onto the local loop for transmission to a customer premises wherein a hybrid differentially amplifies the differentially amplified downstream DSL signal and passes the further differentially amplified downstream DSL signal to the local loop.

It would have been obvious to use a second or more of these extenders of the exact composition to as a method of further extending the range of downstream DSL signals.

(2) With regard to claim 28, claim 28 inherits all limitations of claim 27 above.

***Allowable Subject Matter***

10. Claims 16-21, 26, 29-30 are allowed.
11. Claims 2, 4, 8, 10-13 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
12. Claim 25 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action.
13. The following is a statement of reasons for the indication of allowable subject matter:  
The instant application discloses a loop extender for improving downstream and upstream DSL signals over the local loop. A search of prior art records has failed to teach a loop extender comprising; “an inverting amplifier coupled to the upstream filter/ amplifying equalizer for inverting the attenuated and amplified upstream DSL signals amplified and passing the inverted upstream DSL signals to the first hybrid “ as disclosed in claims 2, 10, 16, 29, or a method comprising “inverting the amplified upstream DSL signal using an inverting amplifier” as disclosed in claim 25 or “means for inverting the amplified upstream DSL signal using an inverting amplifier” as disclosed in claim 26.

***Conclusion***

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.
  - a.) Gorcea et al. discloses in US Patent 6,681,012 B1 Directional Receiver Coupling Arrangement With Frequency Selectivity and Gain control For DSL.

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b.) Cogburn discloses in US Patent 5,825,819 Asymmetrical Digital Subscriber Line (ADSL) Line Driver Circuit.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lawrence B Williams whose telephone number is 703-305-6969. The examiner can normally be reached on Monday-Friday (8:00-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on 703-305-4714. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Lawrence B. Williams

lbw  
January 8, 2005

  
AMANDA T. LE  
PRIMARY EXAMINER